

Name:

Date:

Period:

Biology: Photosynthesis & Cellular Respiration Web Quest

Section 1: Overview of Photosynthesis

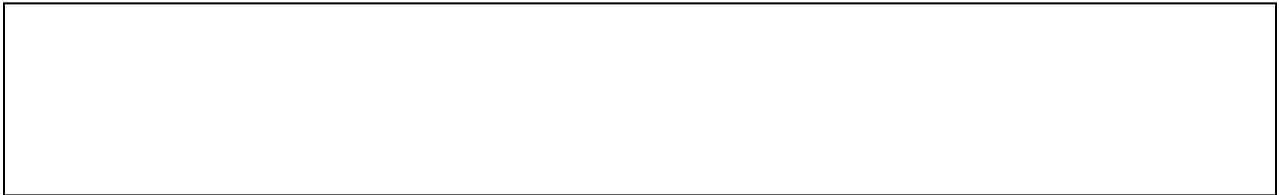
http://www.phschool.com/science/biology_place/biocoach/photosynth/overview.html

Concept 1: An Overview of Photosynthesis

- 1) What is the overall equation for photosynthesis?

Concept 4: Structure of a Leaf -

- 2) Draw and label a cross section of a leaf.



- 3) What are the plant's main photosynthetic organs?

- 4) What are the products of photosynthesis?

Concept 6: Chloroplast Structure

- 5) Draw and label a chloroplast



Concept 8: Cooperation of the Light Reactions and the Calvin Cycle

- 6) What are the two sets of reactions that need to occur in order for Photosynthesis to take place?
- 7) The light reactions convert light energy into chemical energy in the form of ____ and ____.
- 8) Where do the light reactions take place within the chloroplast?
- 9) Where does the Calvin Cycle take place within the chloroplast?
- 10) What is the role of the ATP and NADPH molecules?
- 11) What is the major output product of the Calvin Cycle?

Section 2: Calvin Cycle

http://faculty.nl.edu/jste/calvin_cycle.htm

Play the animations and read the summaries to answer the following:

- 1) What molecules are providing ENERGY for the production of G3P (a simple sugar)?
- 2) How many carbons are recycled in the Calvin Cycle?
- 3) How many molecules of ATP does it take to make one molecule of glucose?
- 4) How many 'turns' of the Calvin Cycle does it take to make one molecule of glucose?

Section 3: Cellular Respiration

<http://www.science.smith.edu/departments/Biology/Bio231/>

Use the links on this page to view the animations and answer the following questions about each stage of cellular respiration.

1. Glycolysis & Fermentation

Glycolysis is the first step of cellular respiration. It can happen in the presence or absence of oxygen. Click on the glycolysis link and view each step of the animation to answer these questions:

- 1) Where does glycolysis take place in the cell?
- 2) How many ATPs are needed to activate a glucose molecule?
- 3) How many ATPs are generated when pyruvate is formed?
- 4) What is the "net gain" of ATP molecules through glycolysis?

2: Krebs Cycle

The Citric Acid Cycle follows glycolysis when oxygen is present in the cell. Click on the Citric Acid Animation and view it step by step to answer the following questions:

What three-carbon molecule from glycolysis is used in the Citric Acid Cycle?

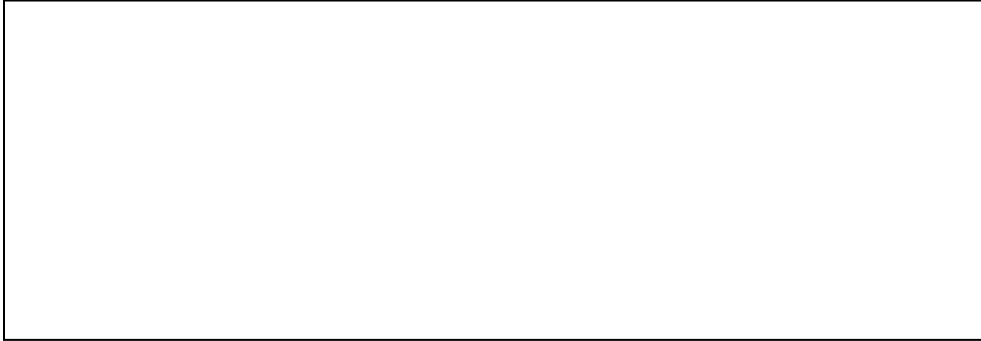
- 1) Where does the citric acid cycle take place?
- 2) One molecule of pyruvate yields:
_____ CO₂
_____ FADH₂
_____ NADH
_____ ATP

3: Electron Transport Chain

Click on the Electron Transport Chain (ETC) animation and watch it step by step to answer the following questions.

1) Where is the electron transport chain located?

2) Draw a picture of the electron transport chain and illustrate the movement of electrons using arrows:



3) What molecules are supplying electrons to the chain?

4) Electrons are used to 'pump' protons (H^+) to one side of the membrane. This creates a proton gradient- many H^+ atoms on one side and few or none on the other. The proton (H^+) gradient is often compared to the energy captured by a river dam. Explain how the electron transport chain might fit this analogy.

5) Where does the energy to make ATP from ADP come from?